

1966 OPERATING SUMMARY

# **NORTH BAY**

**AREA**

## ***water pollution control plant***

**LIBRARY COPY**

**AUG 1 1974**

**MINISTRY OF THE  
ENVIRONMENT**

LABORATORY LIBRARY  
MINISTRY OF THE ENVIRONMENT

**ONTARIO WATER RESOURCES COMMISSION**

***Division of Plant Operations***

### Copyright Provisions and Restrictions on Copying:

This Ontario Ministry of the Environment work is protected by Crown copyright (unless otherwise indicated), which is held by the Queen's Printer for Ontario. It may be reproduced for non-commercial purposes if credit is given and Crown copyright is acknowledged.

It may not be reproduced, in all or in part, for any commercial purpose except under a licence from the Queen's Printer for Ontario.

For information on reproducing Government of Ontario works, please contact ServiceOntario Publications at [copyright@ontario.ca](mailto:copyright@ontario.ca)



ONTARIO WATER RESOURCES COMMISSION

OFFICE OF THE GENERAL MANAGER

Members of the Joint Local Advisory Committee  
of the North Bay Area Pollution Control Works,  
City of North Bay.

Gentlemen:

We are pleased to submit to you the 1966 Operating Summary for the North  
Bay Area Water Pollution Control Plant, OWRC Project No. 58-S-10.

It is hoped that our joint participation in efforts to combat water pollution  
will have even more success in the coming year.

Yours very truly,

A handwritten signature in dark ink, appearing to read "D. S. Caverly", is written over the typed name.

D. S. Caverly,  
General Manager.



ONTARIO WATER RESOURCES COMMISSION

801 BAY STREET

TORONTO 5

J. A. VANCE, LL.D.  
CHAIRMAN

J. H. H. ROOT, M.P.P.  
VICE-CHAIRMAN

D. S. CAVERLY  
GENERAL MANAGER

W. S. MacDONNELL  
COMMISSION SECRETARY

General Manager,  
Ontario Water Resources Commission.

Dear Sir:

I am happy to present you with the 1966 Operating Summary for the North Bay Area Water Pollution Control Plant, OWRC Project No. 58-S-10.

The report offers a concise summary of operating data for the year and comparisons with previous years where these are applicable and significant.

Yours very truly,

A handwritten signature in cursive script, appearing to read "B. C. Palmer".

B. C. Palmer, P. Eng.,  
Director,  
Division of Plant Operations.

## FOREWORD

● This operating summary contains complete information on the management of the project during 1966. It contains a concise review of the year's plant operation, significant financial details, and a visual presentation in graphs and charts of technical performance.

The information will be of value to interested parties in assessing the adequacy of the project at this time and its ability to meet future requirements.

The report is the result of co-operation by several groups within the Division of Plant Operations. These include the statistics section and the technical publications section. The Division of Finance and the draughting section of the Division of Sanitary Engineering were also closely associated with its publication.

The Regional Operations Engineer, however, has had the primary responsibility for the content, and will be happy to answer any questions regarding it.

## **C O N T E N T S**

Foreword . . . . .	1
Title Page . . . . .	3
'66 Review . . . . .	4
Project Costs . . . . .	6
Operating Costs . . . . .	8
Process Data . . . . .	11
Recommendations . . . . .	Inside back cover

**NORTH BAY AREA**  
**water pollution control plant**

operated for

THE CITY OF NORTH BAY

and

THE TOWNSHIPS OF WIDDIFIELD AND WEST FERRIS

by the

ONTARIO WATER RESOURCES COMMISSION

---

CHAIRMAN: Dr. James A. Vance

VICE-CHAIRMAN: J. H. H. Root, M.P.P.

COMMISSIONERS

W. D. Conklin	H. E. Brown
D. A. Moodie	L. E. Venchiarutti

---

GENERAL MANAGER: D. S. Caverly

ASSISTANT GENERAL MANAGERS

L. E. Owers	K. H. Sharpe
F. A. Voegelé	A. K. Watt

COMMISSION SECRETARY

W. S. MacDonnell

---

DIVISION OF PLANT OPERATIONS

DIRECTOR: B. C. Palmer

Assistant Director:	C. W. Perry
Regional Supervisor:	D. A. McTavish
Operations Engineer:	J. N. Dick

801 Bay Street      Toronto 5

# '66 REVIEW

It is the purpose of this report to present operating data and operating problems on the North Bay area WPCP for the year 1966.

The North Bay area WPCP treated a total of 1386 million gallons of waste in 1966. This is an average daily flow of 3.8 million gallons per day. The average daily flows for 1963, 1964, 1965 and 1966 were 3.38, 3.39, 3.78 and 3.80 mgd respectively. The waste flows to the sewage plant exceeded the design flow of 4.0 mgd approximately 50 percent of the time.

The cost of operating the North Bay Area WPCP in 1966 was \$87,375.11. The cost of treating one million gallons of waste in 1966 was \$63.02. The operating costs increased approximately \$8,200 from the 1965 operating cost of \$79,171.60. This increase in cost was due primarily to the increase in salaries of the staff, the increase of casual payroll to maintain 24-hour plant coverage during the chlorination season, increased power, increased general supplies, and increased sundry costs.

The average concentration of the BOD and suspended solids in the waste to the plant was 120 ppm and 169 ppm respectively. The BOD and suspended solids in the plant effluent was 14 ppm and 27 ppm, respectively. This is a percent reduction of BOD and suspended solids of 89 and 84 respectively. The raw sewage BOD was an average concentration for a largely domestic waste.

In 1966, the Northland Engineering Report was presented to the Local Advisory Committee and a special meeting was held to discuss the report. At this meeting, it was also felt that an Engineering Report should be prepared on the flows to the plant, some of the mechanical operating difficulties at the plant with a general comment on when plant expansion may become necessary. The report was not completed in 1966.

Operating difficulties were experienced in the spring of 1966 due to the lack of satisfactory heat requirements for the digester. Because the plant staff detected the problem of digester foaming in the early stages, the problem was alleviated as much as possible with very few odours coming from the plant. Had this problem not been recognized in its early stage, the problem could have become quite severe.



On several occasions, the flows to the plant became alarmingly great and all available stand-by pumps were obtained by plant staff so as to eliminate any possible basement flooding in the Queen Street area. In the latter part of the year, authorization was given for the construction of an overflow weir on Queen Street to Chippewa Creek alleviating the excessively high storm flows, which occur only several times during the year.

In the spring of 1966, all three primary clarifiers were dewatered and the necessary repairs made to the scraper mechanism in these clarifiers. This involves the rebuilding of the wheels and shafting on all clarifiers. The industrial water pump and the spray water pumps were also overhauled and a new impeller installed in the spray water pump. The vari-drive on the one return activated sludge pump also required the one pulley to be re-splined and a new shaft installed.

In the spring of 1966, the chlorinator was removed, crated and sent to Control and Metering to be completely overhauled so that it would operate with a minimum of difficulty during the chlorination season. The chlorinator had not been overhauled since the time that the plant began operation in August 1960.

Considerable time and effort also centered around the various meters at the plant and metering pits in the sewage collection system. Considerable effort is directed to the maintenance of the meters that measure the waste flows from the various municipalities and on which are based the proportion of operating costs for the North Bay area sewage treatment plant.

The overhaul of the Climax engine was completed in the early part of the year and was a carry-over from the year 1965. The Climax engine was completely overhauled in that the crank shaft was polished, piston sleeves and rings were checked and replaced where found necessary, the cam shaft was ground, new valves installed where necessary and the valves ground on the engine.

There were no staff changes at the North Bay area WPCP in 1966.

The plant was inspected by head office engineers and technicians and found to be in a satisfactory condition.

The plant staff carried out their duties in a satisfactory manner.

## PROJECT COSTS

### NET CAPITAL COST

North Bay	\$1,162,778.90
West Ferris	899,874.10
Widdifield	<u>251,890.73</u>
Long Term Debt to OWRC (Estimated)	<u>\$2,314,543.73</u>
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1966	
North Bay	\$ 188,752.93
West Ferris	131,742.02
Widdifield	<u>25,378.26</u>
TOTAL	<u>\$ 345,873.21</u>

The total cost to the municipality during 1966 was as follows:

### NET OPERATING

North Bay	\$67,523.49	
West Ferris	13,188.01	
Widdifield	<u>10,260.54</u>	\$ 90,972.04

### DEBT RETIREMENT

North Bay	\$23,465.00	
West Ferris	18,160.00	
Widdifield	<u>5,083.00</u>	\$ 46,708.00

### RESERVE

North Bay	\$10,437.24	
West Ferris	6,309.69	
Widdifield	<u>1,374.07</u>	\$ 18,121.00

### INTEREST CHARGED

North Bay	\$65,396.71	
West Ferris	50,609.56	
Widdifield	<u>14,162.35</u>	\$ 130,168.72
TOTAL		<u>\$ 285,969.76</u>

RESERVE ACCOUNT

BALANCE AT JANUARY 1, 1966 (Revised)

North Bay	\$51,388.45	
West Ferris	35,131.55	
Widdifield	<u>4,800.17</u>	\$ 91,320.17

DEPOSITED BY MUNICIPALITY

North Bay	\$ 7,502.77	
West Ferris	4,499.99	
Widdifield	<u>1,732.71</u>	\$ 13,735.47

INTEREST EARNED

North Bay	\$ 3,024.15	
West Ferris	2,032.22	
Widdifield	<u>298.90</u>	\$ 5,355.27
		\$110,410.91

LESS EXPENDITURES

North Bay	\$ 2,035.00	
West Ferris	1,546.47	
Widdifield	<u>69.83</u>	\$ 3,651.30

Balance at December 31, 1966		<u><u>\$106,759.61</u></u>
------------------------------	--	----------------------------

## MONTHLY OPERATING COSTS

MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICAL	GENERAL SUPPLIES	EQUIPMENT	REPAIRS & MAINTENANCE	* SUNDRY	WATER
JAN	3101.56	2812.74					115.99	25.75	65.84	70.49	4.75
FEB	5316.52	2709.80			1330.33		73.29		467.90	701.70	33.50
MARCH	6142.19	2694.85		676.04	461.31		807.59	2.58	539.96	956.46	3.50
APRIL	9523.52	4163.90		765.05	473.08		200.70	37.76	463.22	3410.31	9.50
MAY	6831.22	3384.04	367.62	803.12	488.85		131.42	12.68	393.55	1203.57	46.37
JUNE	10952.40	3538.01	612.56	771.75	489.28	1470.00	245.06	650.61	386.95	2742.12	46.06
JULY	6443.24	2849.39	557.04	672.98	463.02	128.44	451.62		178.98	866.31	275.56
AUG	6292.13	2911.78	557.04	566.01	464.26		225.05		129.47	1117.36	321.16
SEPT	8511.24	4740.45	765.11	295.22	475.17		184.71		397.24	1566.89	86.45
OCT	7537.38	3256.24	329.41		466.69		162.81		508.71	2519.41	344.11
NOV	5604.11	2985.38	115.05	525.38	463.02		274.63	39.95	455.81	1396.81	348.08
DEC	10069.60	2878.92		1299.47	953.20		577.96	3.99	1562.58	2789.12	4.36
TOTAL	** 87375.11	38925.60	3303.83	6375.02	6528.21	1598.44	3450.73	773.32	5550.11	19346.55	1523.40

\* SUNDRY INCLUDES SLUDGE HAULING COSTS WHICH WERE \$14,215.77

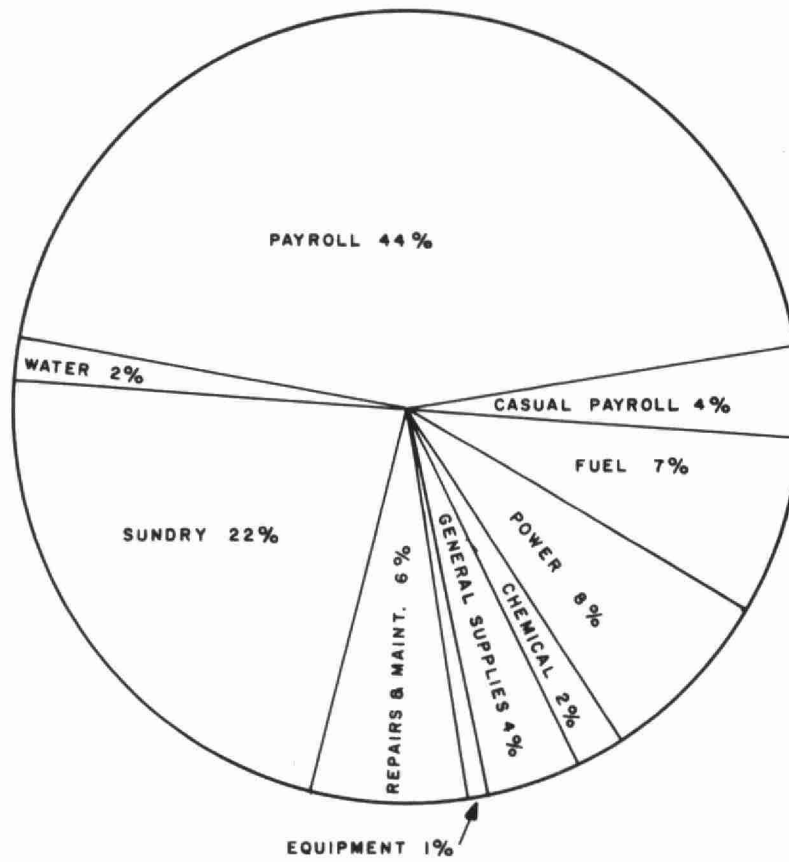
\*\* NOT INCLUDING DIRECT ALLOCATIONS TO WEST FERRIS AND WIDDIFIELD

## YEARLY OPERATING COSTS

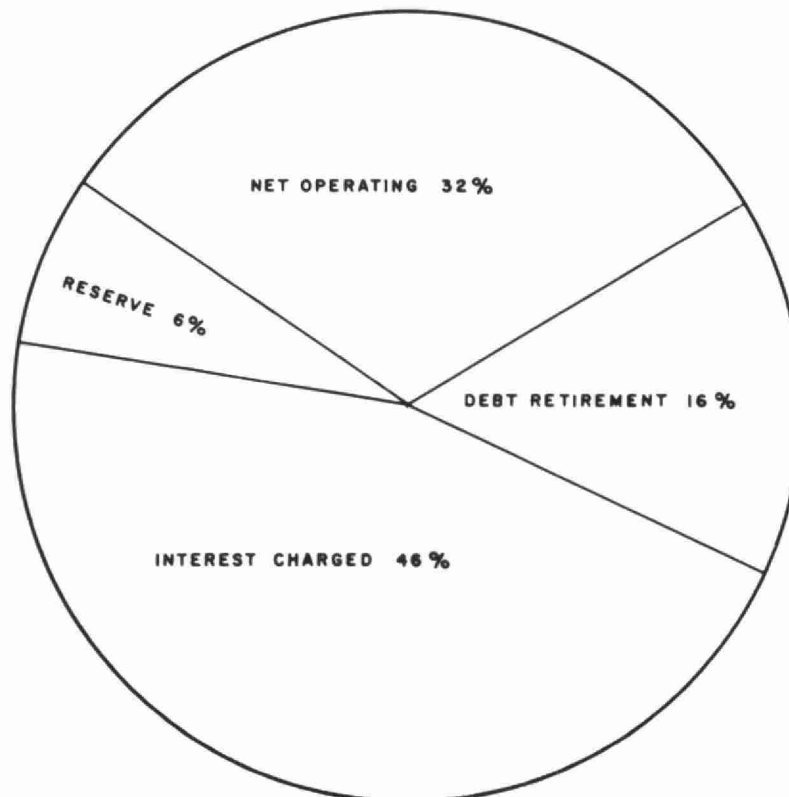
YEAR	M.G. TREATED	TOTAL COST	COST PER FAMILY PER YEAR	COST PER MILLION GALLONS	COST PER L.B. OF BOD REMOVED
1961	1430,000	\$ 7488.15	* \$ 7.53	\$52.37	4 CENTS
1962	1118,630	\$68352.13	\$ 6.82	\$61.09	6 CENTS
1963	1234,303	\$67131.06	\$ 6.63	\$54.39	4 CENTS
1964	1234,328	\$72953.91	\$12.17	\$59.10	4 CENTS
1965	1379,973	\$79171.60	\$13.22	\$57.37	6 CENTS
1966	1386,417	\$87375.11	\$15.05	\$63.02	6 CENTS

\* BASED ON ANNUAL POPULATION ESTIMATE AND 3.9 PERSONS PER FAMILY

## 1966 OPERATING COSTS



## TOTAL ANNUAL COSTS



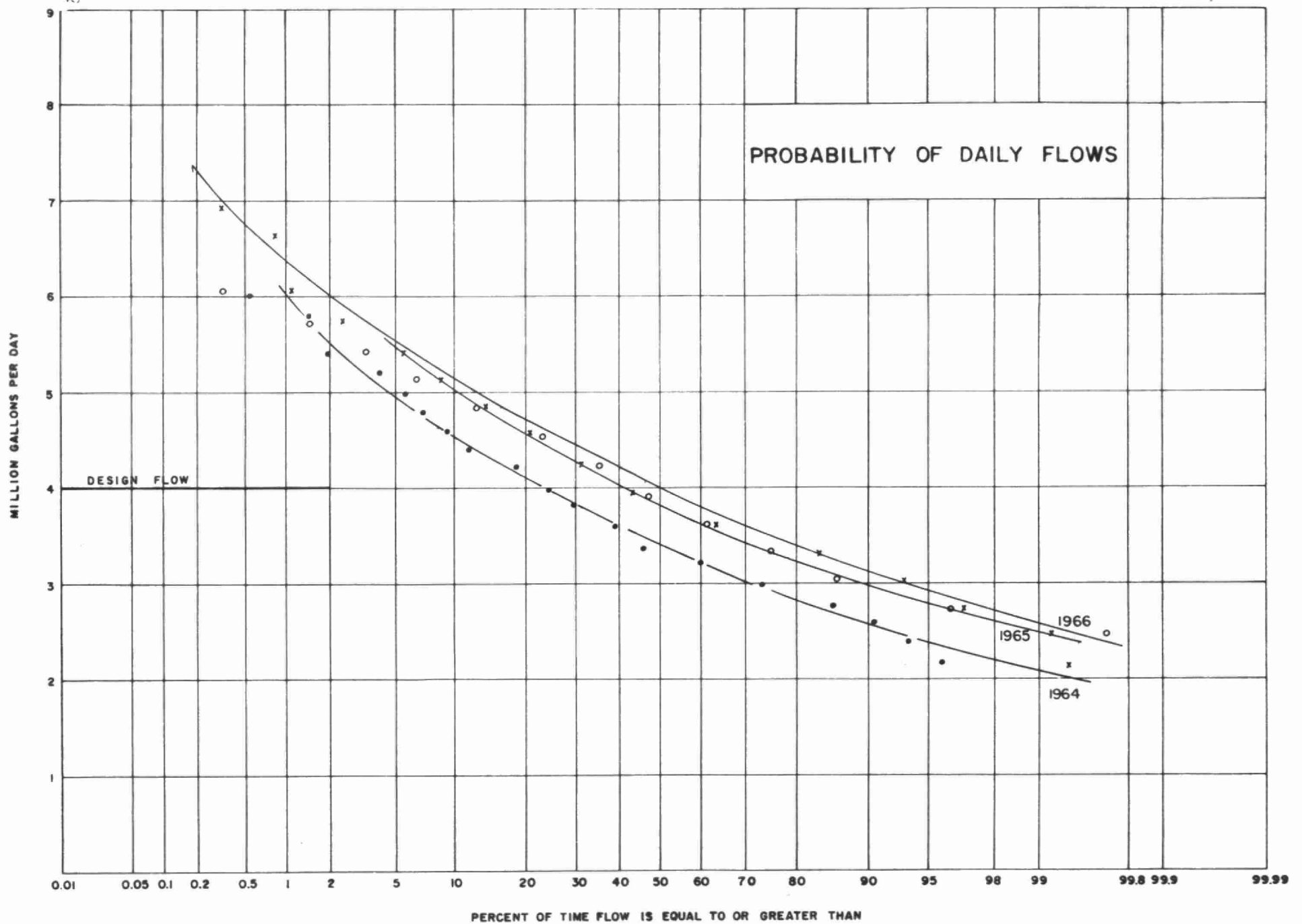
## Process Data

### FLOWS

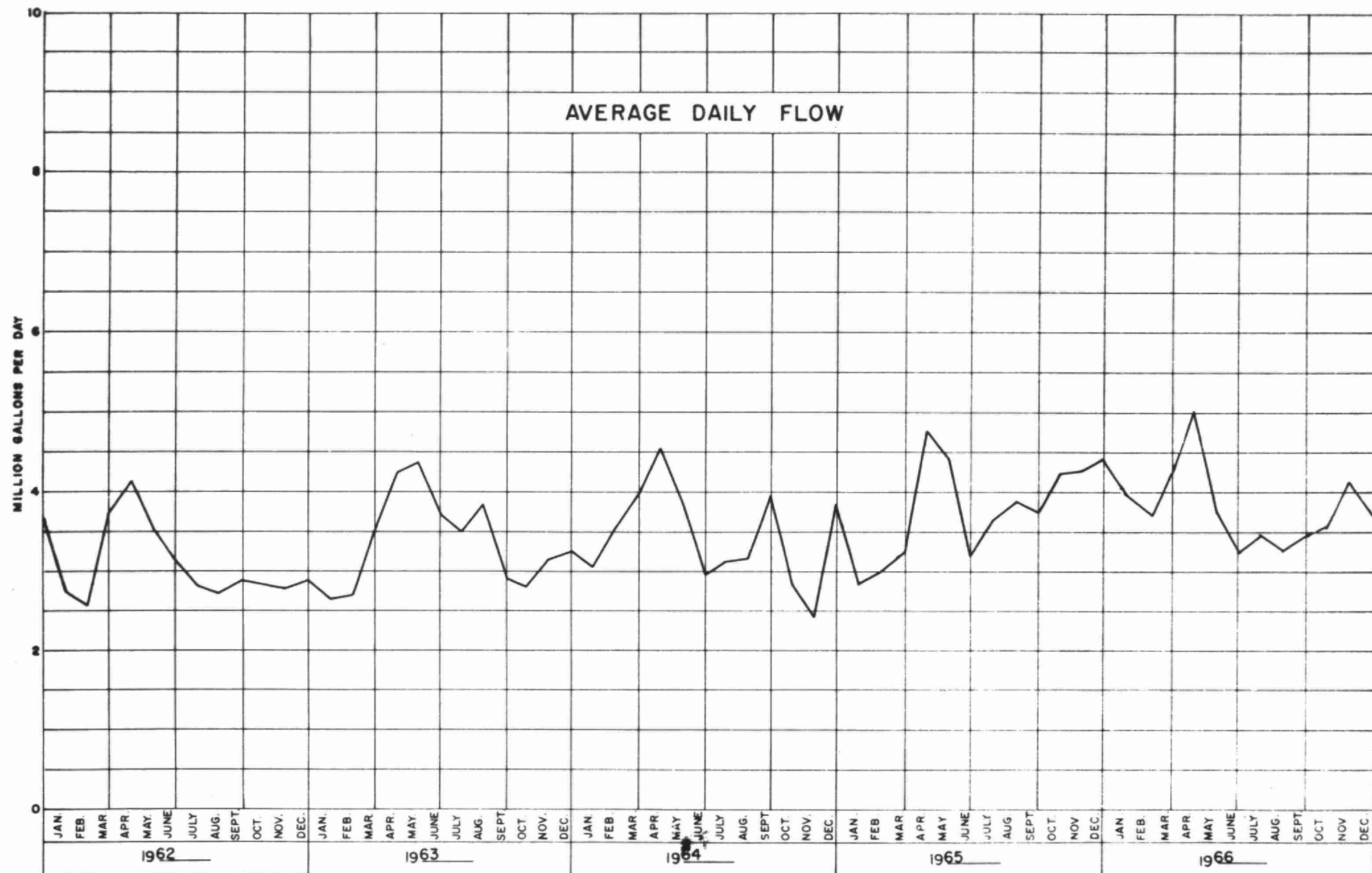
The 1966 probability of daily flows graph is slightly shifted upward on the graph. This is an indication that greater flows are reaching the plant more frequently in 1966 than in 1965. The graph also indicates that 50 percent of the time the flow to the plant is approximately 4 mgd. Approximately 25 percent of the time the flows to the plant exceed 4.5 mgd.

The average daily flow graph shows that the high spring flows to the plant began in the middle of March, continued through April, and began to diminish in May and in the latter part of May reached a more steady daily flow pattern.

The design flow of the plant is 4.0 mgd. It should be noted that this design flow was exceeded approximately 50 percent of the time.

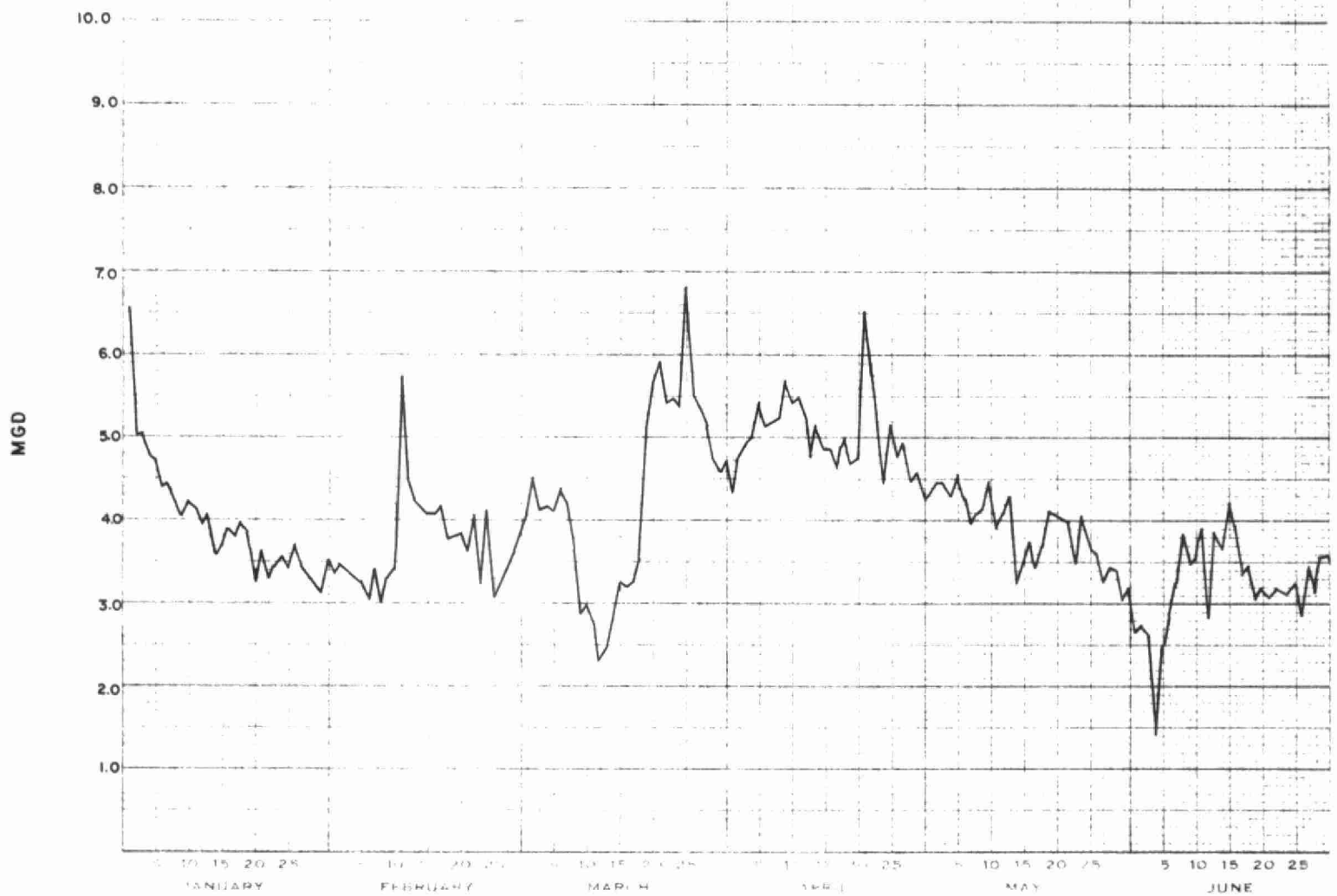


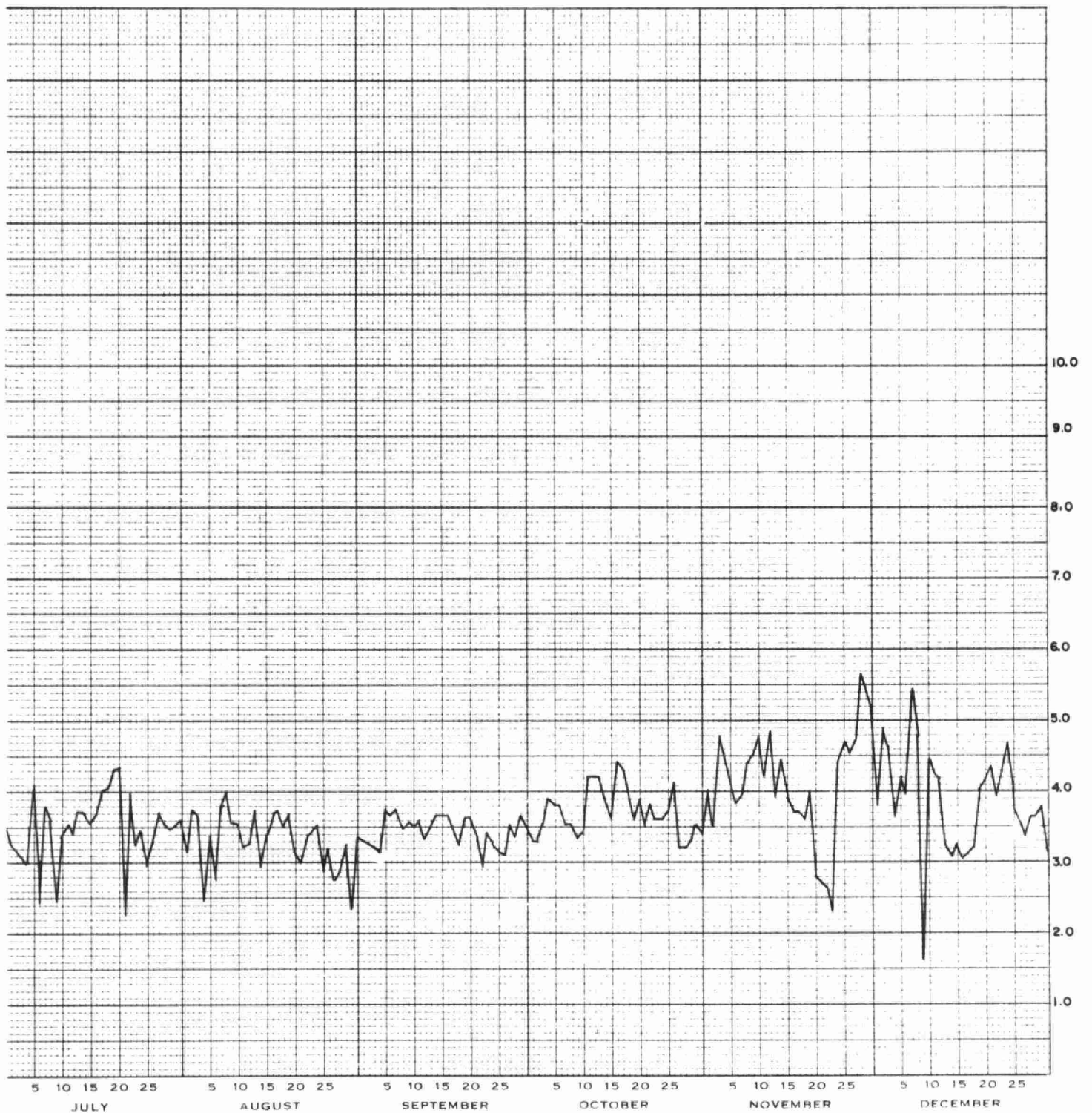
# AVERAGE DAILY FLOW

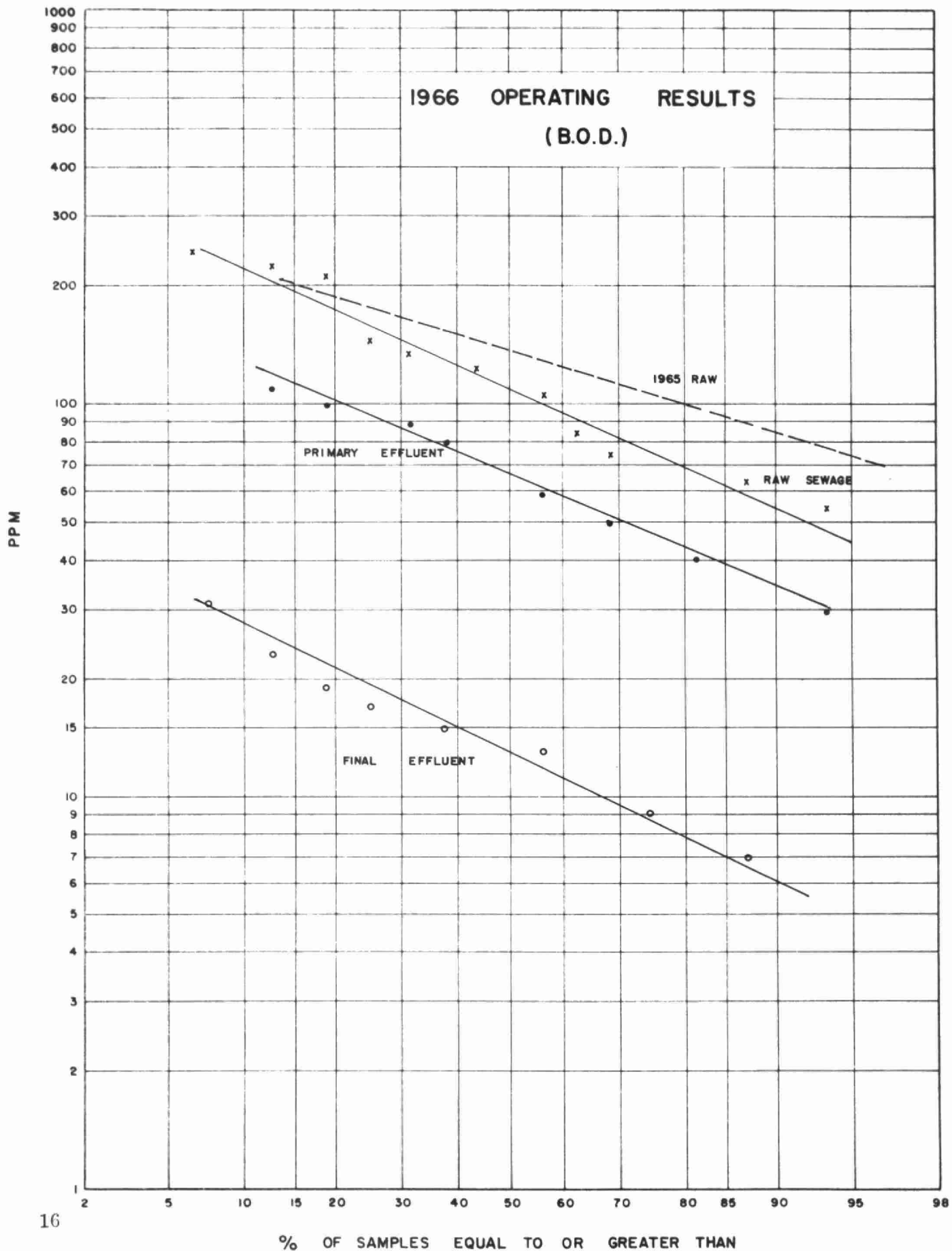


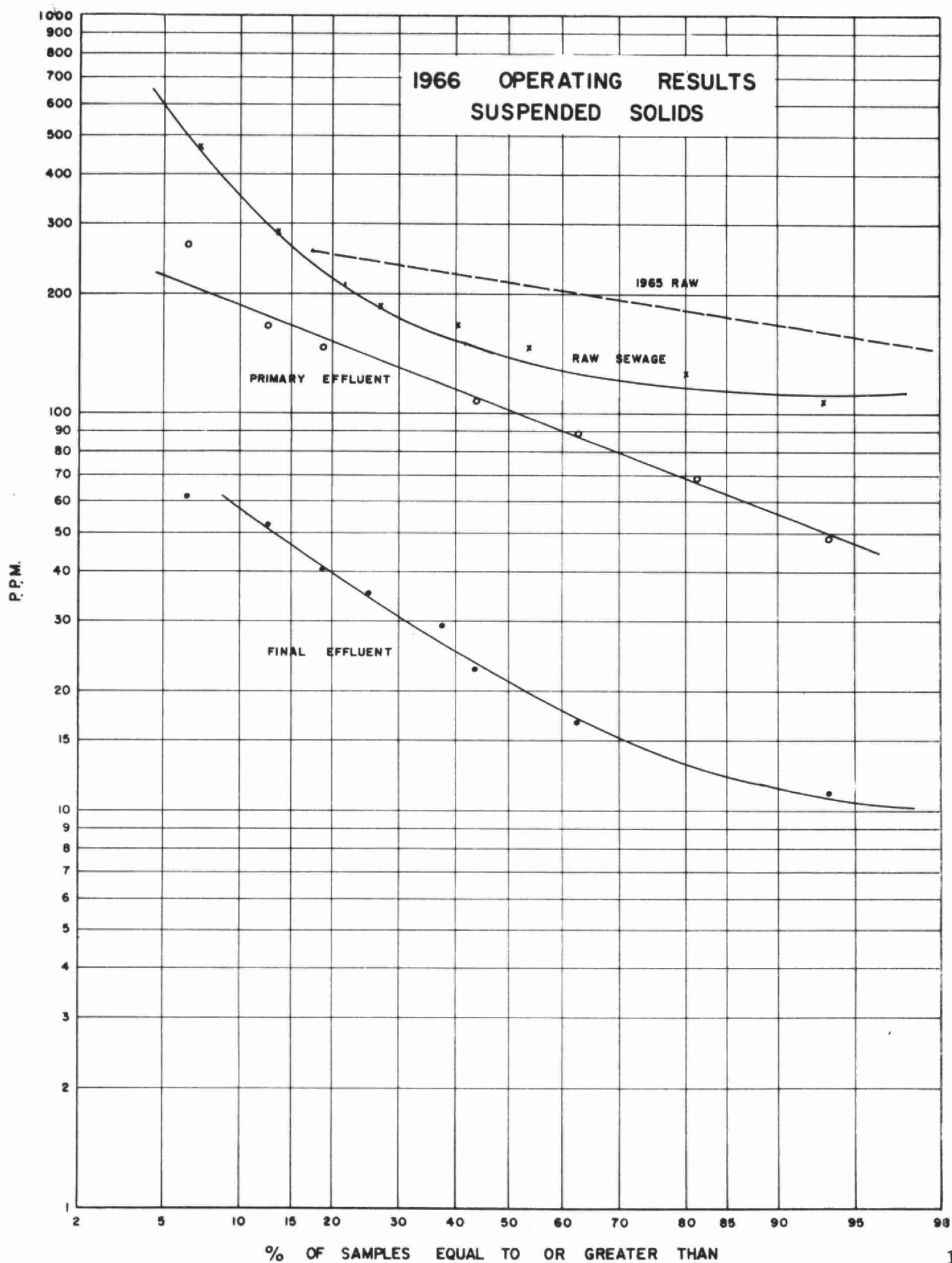


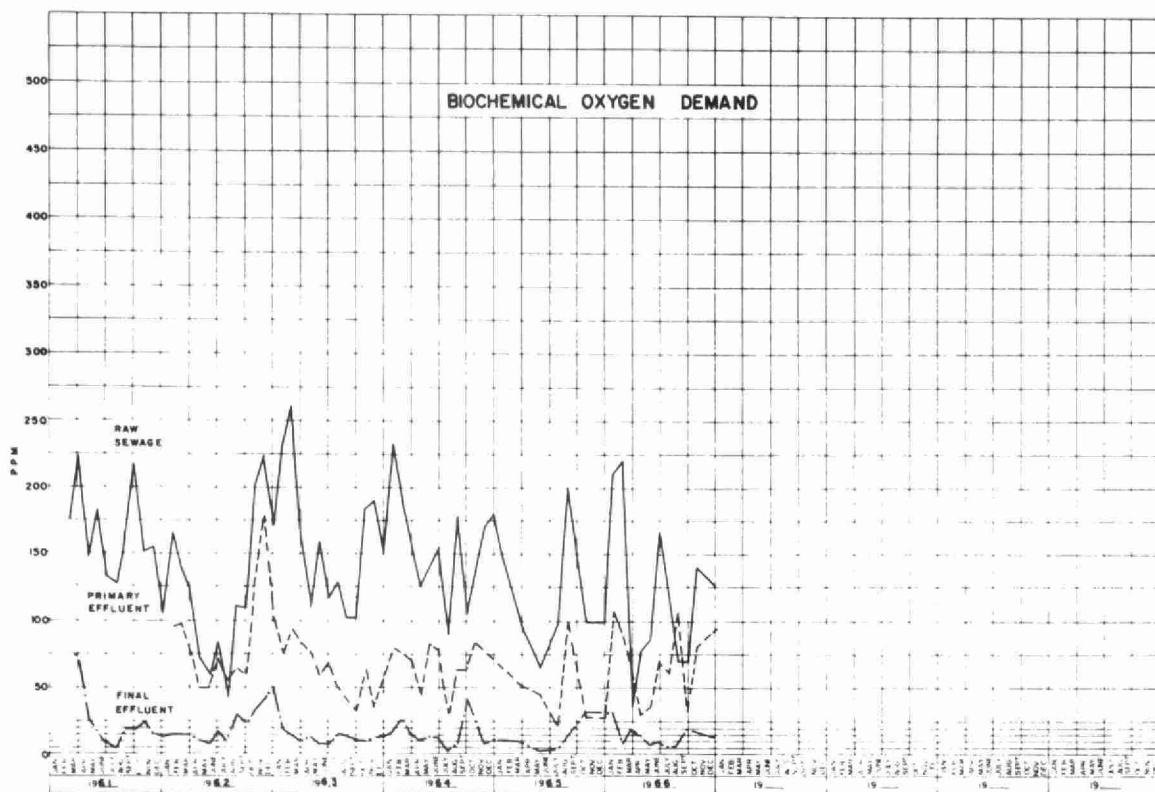
AVERAGE DAILY FLOW  
1966



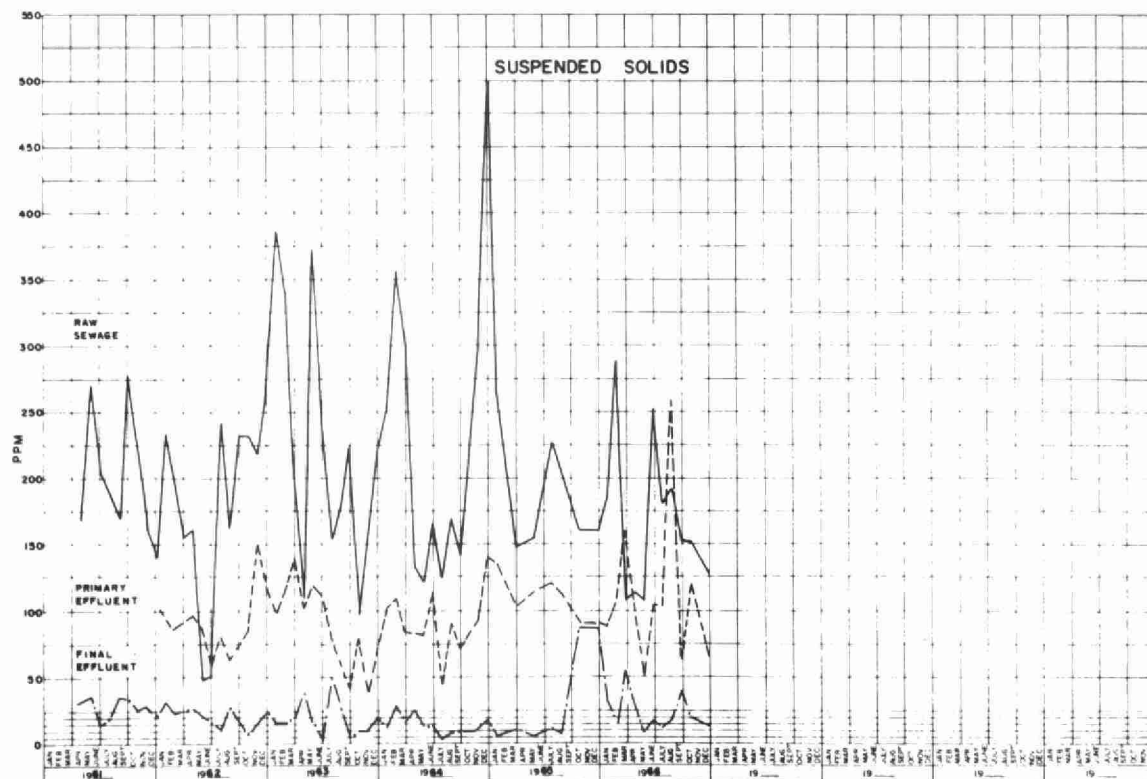








## MONTHLY VARIATIONS



# GRIT, B.O.D AND S.S. REMOVAL

MONTH	B. O. D.				S. S.				GRIT REMOVAL CU. FT.
	INFLUENT PPM.	EFFLUENT PPM.	% REDUCTION	TONS REMOVED	INFLUENT PPM.	EFFLUENT PPM.	% REDUCTION	TONS REMOVED	
JAN.	210	30	85.5	111.1	186	66	64.5	74.1	501
FEB.	220	14	93.5	107.2	288	24	91.5	137.3	647
MAR.	37	19	48.5	11.9	106	54	49.0	34.5	708
APR.	76	14	81.0	46.6	112	25	77.5	65.4	665
MAY	86	7	92.0	45.8	107	7	93.5	58.0	381
JUNE	166	9	94.5	75.8	253	18	93.0	113.5	454
JULY	125	5	96.0	64.2	180	12	93.5	89.9	410
AUG.	68	7	89.5	31.2	192	18	90.5	88.9	561
SEPT.	69	19	72.5	25.2	152	39	74.5	58.3	566
OCT.	140	17	88.0	67.8	152	18	88.0	73.9	574
NOV.	*120	14	88.5	65.3	*169	27	84.0	87.5	562
DEC.	126	13	89.5	66.3	126	11	91.5	67.5	449
TOTAL	-	-	-	734.8	-	-	-	984.4	6478
AVG.	120	14	88.5	61.2	169	27	84.0	82.0	540

\* AVERAGE VALUE SUBSTITUTED; NO SAMPLE

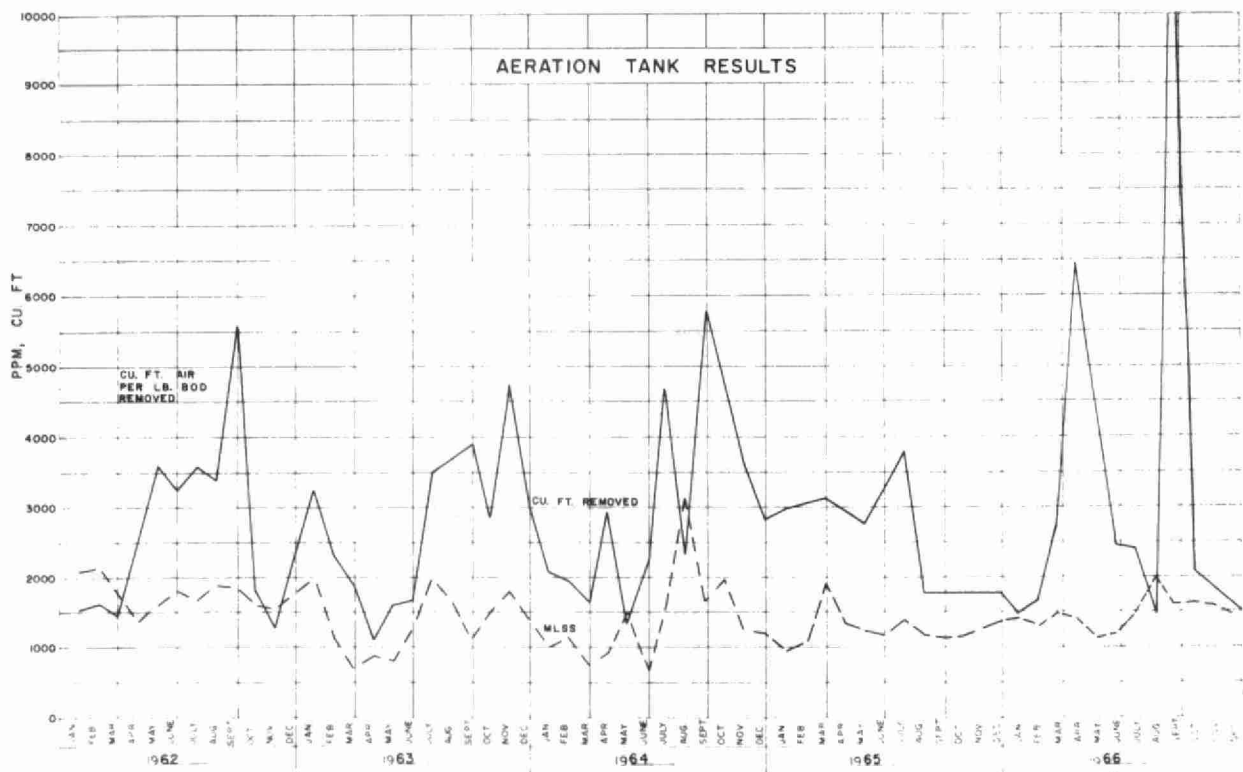
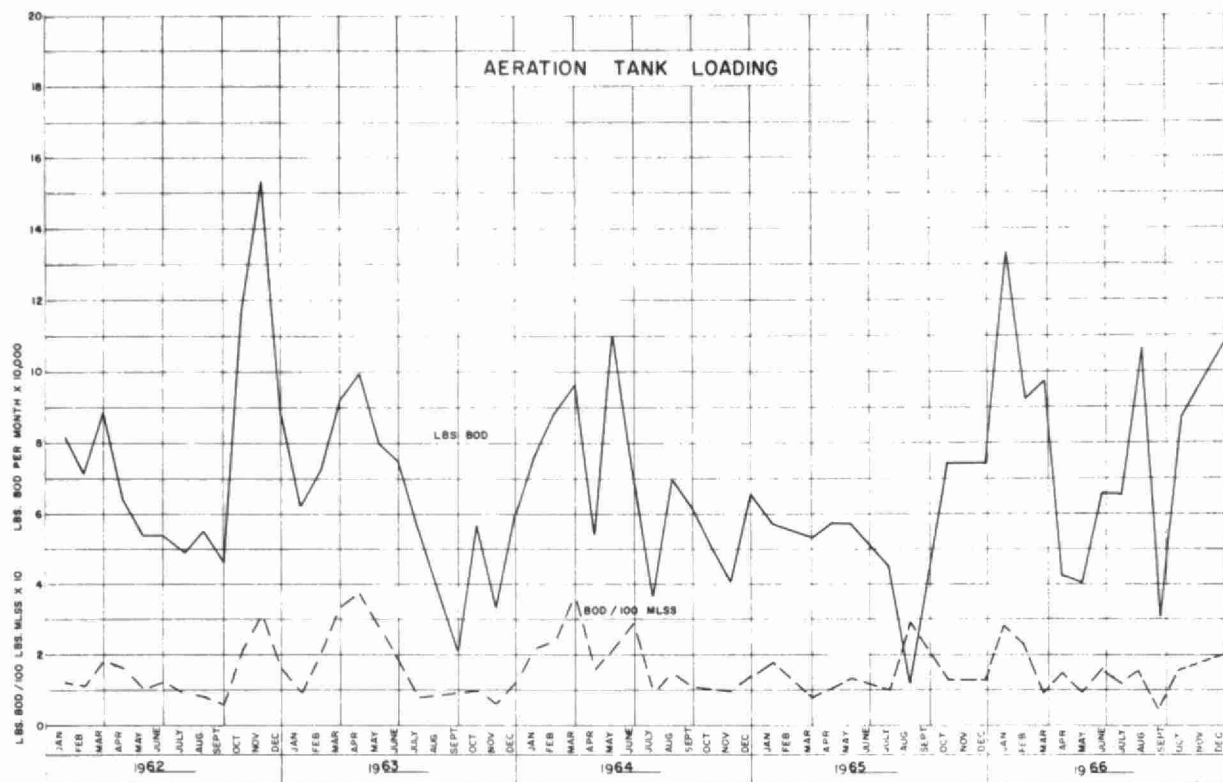
## COMMENTS

The average concentration of BOD and suspended solids in the plant influent was 120 ppm and 169 ppm respectively. The concentration of BOD and suspended solids in the plant effluent was 14 ppm and 27 ppm respectively. This is a total percent reduction in BOD and suspended solids of 88.5 and 84 respectively. These results are to be expected from a well-operated sewage treatment plant. The analyses are based on 11 eight-hour composite samples that were collected at the North Bay area WPCP and submitted to the laboratory in Toronto for analyses.

The strength of the waste has changed very little from the previous year in 1965.

A total quantity of 734 tons of BOD and 984 tons of suspended solids were removed from the waste in North Bay, which would otherwise have found its way into Lake Nipissing. This is substantial removal of potential pollutant material.

The grit removal at the North Bay area WPCP decreased considerably in 1966 to 6478 cubic feet from 8453 cubic feet in the year 1965.





## AERATION SECTION

MONTH	PRIM. EFFL. B.O.D. PPM.	MLSS. PPM.	LBS. BOD. PER 100 LBS. M. L. S. S.	CUBIC FEET AIR PER LB. B.O.D. REMOVED
JANUARY	110	1384	29	1469
FEBRUARY	90	1292	24	1657
MARCH	59	1457	16	2734
APRIL	29	1387	10	6437
MAY	36	1101	10	4313
JUNE	69	1189	17	2430
JULY	62	1466	13	2387
AUGUST	106	1929	17	1433
SEPTEMBER	32	1536	6	10469
OCTOBER	80	1576	17	2087
NOVEMBER	-	1568	-	-
DECEMBER	92	1541	21	1564
TOTAL	-	-	-	-
AVERAGE	70	1452	16	3362

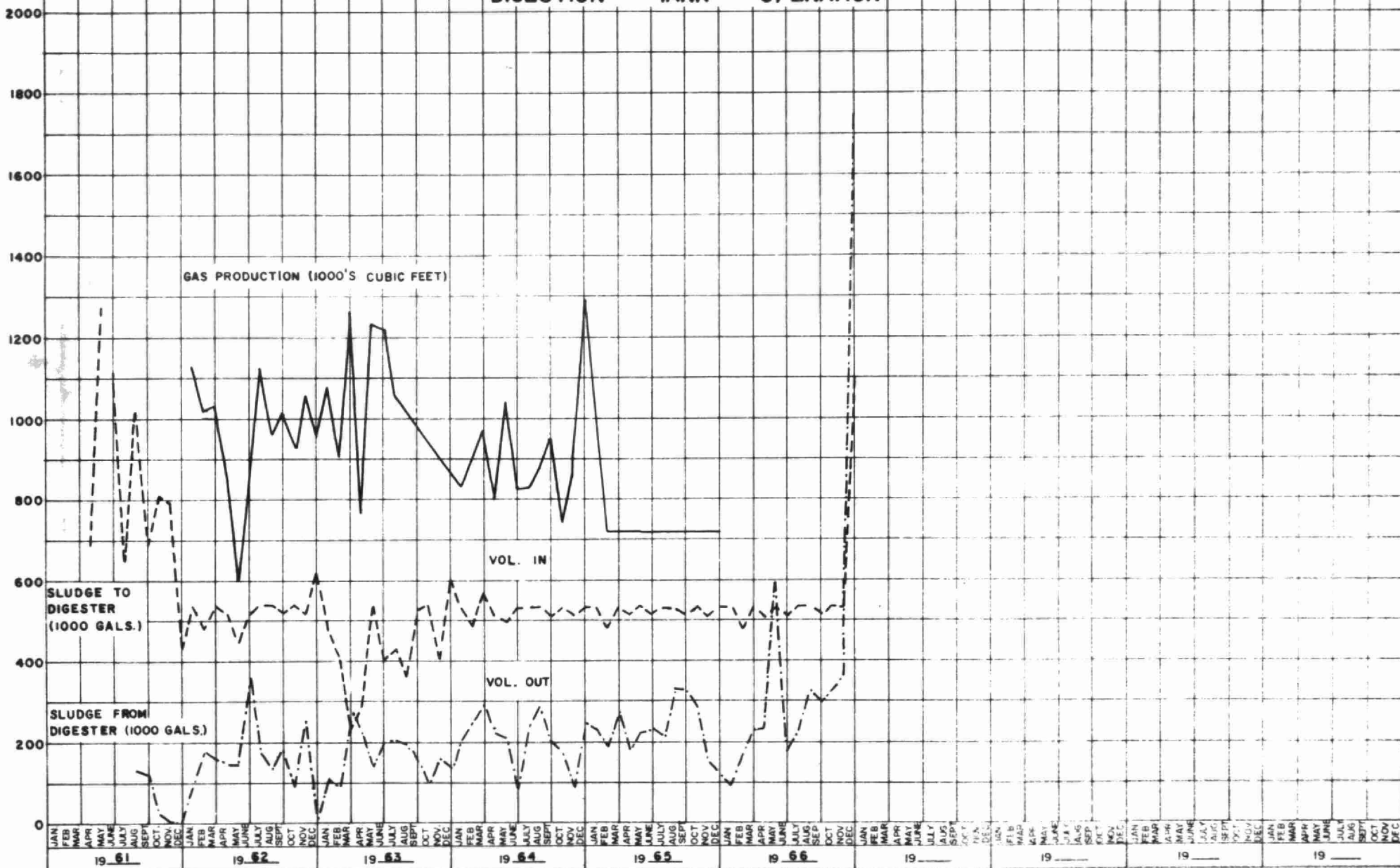
### COMMENTS

The average concentration of mixed liquor suspended solids in the aeration tanks in 1966 was 1,452 ppm. The average aeration tank loading of 16 lbs. of BOD per 100 lbs. of mixed liquor suspended solids is slightly higher than last year but still somewhat lower than the loading from other waste treatment plants possibly comparable to the North Bay WPCP.

The quantity of air required to remove 1 lb. of BOD was 3362 cubic feet. The average figure is also higher than one might expect.



## DIGESTION TANK OPERATION



## DIGESTER OPERATION

MONTH	SLUDGE TO DIGESTERS			SLUDGE FROM DIGESTERS		
	1000'S CU. FT.	% SOLIDS	% VOL. MAT.	1000'S CU. FT.	% SOLIDS	% VOL. MAT.
JAN.	85.85	-	-	15.68	-	-
FEB.	77.54	0.07	-	27.32	1.53	-
MAR.	85.85	0.87	-	36.12	3.40	-
APR.	83.08	3.54	-	37.57	5.44	-
MAY	85.85	2.58	1.81	95.56	7.86	7.06
JUNE	83.08	5.30	5.11	28.26	5.91	-
JULY	85.85	6.05	2.77	37.95	6.52	4.68
AUG.	85.85	0.36	-	52.46	0.96	-
SEPT.	83.08	6.80	-	48.44	9.61	3.30
OCT.	85.85	3.62	2.36	54.03	5.74	1.80
NOV.	83.08	-	-	58.64	-	-
DEC.	178.85	2.95	1.89	298.39	3.52	2.02
TOTAL	1103.81	-	-	790.42	-	-
AVG.	91.98	3.21	2.79	65.87	5.05	3.77

### COMMENTS

A total quantity of 1,104,000 cubic feet of sludge was removed from the primary clarifiers and pumped to the digesters for further decomposition. The percent solid of this material was 3.25. This concentration is satisfactory for a raw sludge.

The total quantity of sludge removed from the digesters at the North Bay plant in 1966 was 790,000 cubic feet. This digested sludge had a solids concentration of 5.05 percent.

The quantity of gas produced at the plant is not available since difficulties were experienced with the operation of the sewage gas meter for the entire year.

## **CHLORINATION**

### **PLANT FLOW IN MILLIONS OF GALLONS**

JANUARY	123.441	JULY	107.015
FEBRUARY	104.039	AUGUST	102.227
MARCH	132.693	SEPTEMBER	103.125
APRIL	150.322	OCTOBER	110.290
MAY	115.980	NOVEMBER	123.257
JUNE	96.607	DECEMBER	117.421
TOTAL		<u>1386.417</u>	
AVERAGE		<u>115.535</u>	

### **COMMENTS**

Chlorination was practised at the North Bay area WPCP for effluent disinfection purposes from May 15 to October 15.

A chlorine residual of 0.5 ppm was maintained in the plant effluent which is the requirement of the Division of Sanitary Engineering of the OWRC. Chlorine dosages were not available since no means of weighing one ton of chlorine cylinders was available.



## RECOMMENDATIONS

1. Efforts should be continued by the three municipalities to eliminate storm water from gaining access into the sanitary sewers.
2. The Gore & Storrie report should be reviewed and discussed as soon as possible so that the necessary modifications and plant expansion can be initiated.

Date Due


LABORATORY LIBRARY  
MINISTRY OF THE ENVIRONMENT

